Kalyani School

PERIODIC TEST-1 (2025-26)
QUESTION PAPER

Subject: Chemistry (043)
Marks: 25
Name: _____

Grade: XII
Time: 1 Hour
Date: 16-06-2025

General Instructions:

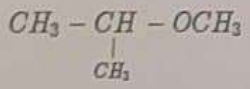
I. The question paper comprises five sections - A to E. There are 12 questions in the question paper. All questions are compulsory.
II. Section - A, Question Nos. 1 to 6 are Multiple Choice Questions (MCQs) and Assertion - Reason Type Questions, carrying 1 mark each.
III. Section - B, Question Nos. 7 and 8 are Short Answer Type Questions, carrying 2 marks each.
IV. Section - C, Question Nos. 9 and 10 are Short Answer Type Questions, carrying 3 marks each.
V. Section - D, Question No. 11 is a Case Based Question carrying 4 marks.
VI. Section - E, Question No. 12 is a Long Answer Type Question carrying 5 marks.
VII. There is no overall choice. However, internal choices have been provided in some questions. Attempt only one of the alternatives in such questions.
VIII. Use of calculators and log tables is not permitted.
IX. Atomic masses of some elements: H= 1u, C = 12u, N= 14u, He = 4u, Ca = 40u, Na = 23u, O = 16u, Cl = 35.5u, S= 32

SECTION – A

Question Nos. 1 to 4 are multiple-choice questions. Choose the most appropriate answer:

1. CH_3CH_2OH can be converted into CH_3COOH by _____. [1]
   a) catalytic hydrogenation
   b) treatment with pyridinium chlorochromate
   c) treatment with $LiAlH_4$
   d) treatment with $KMnO_4$

2. What is the IUPAC name of the following compound? [1]



   a) 1-methoxy-l-methylethane
   b) 2-methoxypropane
   c) 2-methoxy-2-methylethane
   d) Isopropyl methyl ether

3. Which of the following is the correct order of decreasing S_N2 reactivity? [1]
   a) $RCH_2X > R_2CHX > R_3CX$
   b) $R_2CHX > R_3CX > RCH_2X$
   c) $R_3CX > R_2CHX > RCH_2X$
   d) $RCH_2X > R_3CX > R_2CHX$

4. Identify the products [A] and [B] in the reactions: [1]
   $RX + AgCN \rightarrow [A] + AgX$;
   $RX + KCN \rightarrow [B] + KX$
   a) [A] → RCN, [B] → RCN
   b) [A] → RNC, [B] → RCN
   c) [A] → RCN, [B] → RNC
   d) [A] → RNC, [B] → RNC

In Question Nos. 5 and 6, two statements are given - one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

a) Both A and R are true, and R is the correct explanation of A.

b) Both A and R are true, but R is not the correct explanation of A.

c) A is true, but R is false.

d) A is false, but R is true.

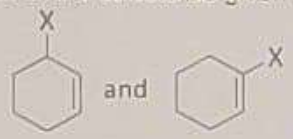
5. **Assertion (A):** Addition reaction of water to but-1-ene in acidic medium yields butan-1-ol. [1]
   Reason (R): Addition of water in an acidic medium proceeds through the formation of carbocation.
6. **Assertion (A):** Ethanol is a weaker acid than phenol. [1]
   Reason (R): Sodium ethoxide may be prepared by the reaction of ethanol with aqueous NaOH.

SECTION – B

7. Compound 'A' with molecular formula C_4H_9Br is treated with aq. KOH solution. The rate of this reaction depends upon the concentration of the compound 'A' only. When another optically active isomer 'B' of this compound was treated with an aq. KOH solution, the rate of reaction was found to be dependent on the concentration of both the compound and the KOH. Write down the structural formula of both the compounds 'A' and 'B'. [2]
8. Write the structures of compounds X, Y and Z in the following reaction: [2]

   a) $CH_3\text{-}\underset{\underset{Br}{|}}{CH}\text{-}CH_3 \xrightarrow{\text{alc.KOH}} X \xrightarrow{\text{HBr, Peroxide}} Y \xrightarrow{\text{NaI, Acetone}} Z$

   b) Out of the structures given below, which one is an example of allylic halide?



SECTION – C

9. Illustrate the following reactions, giving a suitable example for each: [3]
   a) Kolbe's reaction
   b) Reimer-Tiemann reaction
   c) Swartz Reaction
10. a) Name the starting material used in the industrial preparation of phenol. [1]
    b) Write the mechanism of acid dehydration of ethanol to yield ethene. [2]

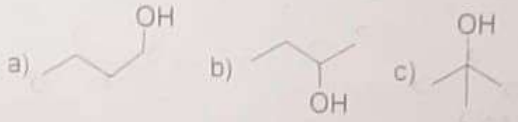
SECTION – D

11. **Read the passage given below and answer the questions that follow:**

Alcohols and phenols, crucial daily compounds, result from alkene hydration, glucose fermentation, and reduction of various carbonyl compounds. Alcohols dissolve in water; boiling points increase with mass and decrease with branching. Dehydration at 443K involves a carbocation mechanism; at 413K with concentrated H_2SO_4, excess alcohol yields diethyl ether. Alcohols partake in nucleophilic substitution and esterify with carboxylic acids, amides, acid halides, and anhydrides.

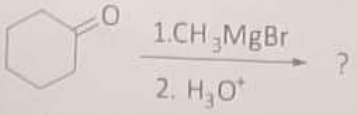
Phenol derives from cumene, diazonium salts, anisole, or chlorobenzene and is utilized to synthesize salicylaldehyde, salicylic acid, aspirin, methyl salicylate, and p-benzoquinone. Phenol undergoes electrophilic substitution at o- and p- positions. Ethers, akin to alcohols, exhibit low boiling points and function as solvents. Unsymmetrical ethers employ Williamson synthesis. Ethers react with HI, undergoing S_N1 or S_N2, contingent on carbocation stability. Aromatic ethers, like anisole, engage in electrophilic substitution at ortho and para positions.

a) Arrange the following in increasing order of the boiling point: [1]



b) Write a distinguishing test between phenols and alcohols. [1]

c) Complete the following chemical reaction: [2]

i) 

ii) 

OR

c) Answer the following questions: [2]

(i) Why is the R–O–H bond angle in alcohol less than the tetrahedral bond angles?

(ii) Why is the C-OH bond length in CH_3OH longer than the C-OH bond length in phenol?

SECTION – E

12. a) What happens when: [3]
    i. n-butyl alcohol is treated with PCl_5.
    ii. Ethanol is treated with Cu at 573K.
    iii. Ethyl chloride is treated with alco. KNO_2.

b) How can the following conversions be carried out? [2]
    i. 2-Methyl-1-propene to 2-chloro-2-methylpropane
    ii. Chlorobenzene to toluene

OR

a) How can the following conversions be carried out? [3]
    i. Toluene to benzyl alcohol
    ii. Aniline to chlorobenzene
    iii. 2-Chlorobutane to 3, 4-dimethyl hexane

b) Answer the questions given below: [2]
    i. Why should Grignard reagents be prepared under anhydrous conditions?
    ii. Why is $SOCl_2$(thionyl chloride) preferred for the preparation of alkyl chloride from alkyl alcohol?
